Exploration of Transportation in Nordic Countries: Observations of Accessibility, Design, and Ease

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Abstract

- The purpose of this project is to highlight applications of user-oriented design in Nordic cities (**Copenhagen, Stockholm, and Helsinki**) that are used to improve commuter usability, satisfaction and safety.
- To address this purpose, an observational methodology was used to code data from imagery and notes relating to satisfaction in predetermined categories (Safety Measures, Usability, and Weather).
- Results are indicative of applied means to improve commuter satisfaction and considerations of safety for commuters in this region and even for those in often underrepresented groups.

Research Questions

1. What urban planning designs have been observed to be implemented to provide ease for those commuting in this region?
2. What is being observed to be implemented as aides to all members of society especially those in need of extra assistance?
3. What is observed to be implemented to ensure safety for commuting people in these regions, especially at night?

Introduction

- **Commuter satisfaction** has been shown to have an impact in areas like work performance and health, with stress from commuting linked to "poor quality sleep, exhaustion, depression, and feelings of poor health" (Legrain, Eluru, & El-Geneidy, 2015, p. 142).
- Although previous research shows a link between impact of commuting and well-being (satisfaction), there is limited research on what is implemented to address commuter satisfaction.
- Nordic transportation systems and its users were observed to potentially aid in filling in that gap, given their high ratings of overall life satisfaction and low rates of transportation incidents and accidents.

Methodology

Research was conducted in Copenhagen, Denmark; Stockholm, Sweden; and Helsinki, Finland. For approximately six days in each city notes were made on commuters utilizing active and non-active modes of transportation. Since this study was observational, **field observations** (note taking and photographs) were used to depict qualitative information. This information was categorized according to what was observed in the three cities using a matrix. Notes were written and organized on a mobile device via Google Drive, detailing the means in which transportation is designed to bring ease or accommodate commuters. This information was **codified**. In qualitative design, coding organizes and analyzes data which creates links within topics, which in this study was between facets of satisfaction and commuter accommodations (Allen, 2017).

Results

About 400 images were used to analyze transportation as it relates to components of commuter satisfaction within three cities. These images were given descriptions based on their purpose, physical appearance, and usability and were then coded into pre-determined categories (safety measures, usability and weather). These categories were further broken into subcategories where deemed appropriate (safety measures: traffic safety and personal security; and usability: general ease and those with disabilities). The chart below shows main observations:

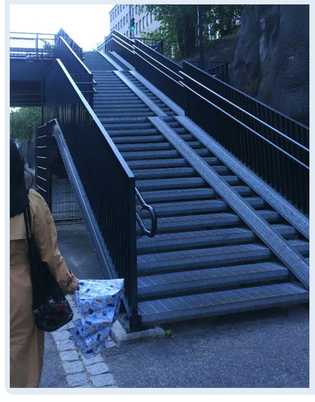
		Walking	Biking	Cars	Public Transportation
Safety Measures	Traffic Flow	• Pedestrians have their own lanes and lights • There are many pedestrian only squares	Bikers have their own lanes and lights as well	• There are roundabouts all throughout the city • Lots of signage for seemingly "obvious" road distinctions	On the train there are sight lines available to avoid being dangerously close to the ledge
	Security	CCTV	CCTV	Cameras placed on intersections	There are cameras available on metro and buses as well as safety levers
Usability	General Ease	• Amble walking room • There were some distinctions made for the "line" encouraging walking in an orderly and organized fashion	• Ample room public transportation • Plenty of places to park, • Ramps to go up and down stairs		• Electronic displays available for buses with accurate arrival times • Charging on the trains, and WIFI on some buses • There are televisions and displays on the bus that show time, temp., upcoming stops, and current events
	Accommodating disabled users	• There are raised lines on the sidewalk that are utilized by those that are visually impaired • Some intersections had automatic crosswalk readers • Auditory cues at crosswalks		Parking priority is provided	• Stop buttons are available at lower heights. • There is plenty of seating and standing room. Those with disabilities are given seating priority. And there are handles at various heights • Lifts and ramps are made available
Weather		Coverage is provided in certain areas, offering protection from the elements		Draining provided within the lanes closest to the shoulder in certain areas	Coverage is provided in certain areas, offering protection from the elements

Conclusion

The results of this study show measures that accommodate commuters. They consist of security, urban design, and ergonomic means to address the needs of all members of society. Future studies could obtain data on commuter satisfaction as it relates to these themes and perhaps how it contributes to other facets of society. These measures are being implemented in the what is considered the happiest region on Earth, the next step could be to learn how to apply these themes to other cities to improve commuter satisfaction.

Examples of ease and usability

1. A **rail** is made available for bicyclists to go up the stairs with ease
2. A **stoplight** shining green, letting pedestrians know that they can walk. Bicyclists have their own lanes and lights.



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